THE

APHL Report

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

DATA SUMMARY OF E 2010 CORE LABORATORY PROFILES SURVEY

Snapshot of
State Public Health Laboratories

AUGUST 2011

The Association of Public Health Laboratories (APHL) is a national non-profit organization dedicated to working with members to strengthen governmental laboratories that perform testing of public health significance. By promoting effective programs and public policy, APHL strives to provide member laboratories with the resources and infrastructure needed to protect the health of US residents and to prevent and control disease globally.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Once thought of as only a testing facility, the State Public Health Laboratories (SPHLs) of the 21st century have evolved into a complex set of institutions whose influence extends to the entire public health system. From outbreak mitigation to emergency response for biological and chemical events, SPHLs are at the center of the action, positioned to react quickly and skillfully as they carry out their mission to protect the health of the American people.

Through the years, the infrastructure of these laboratories have seen minimal changes; more than a third of them have an active Laboratory Advisory Committee, similar to the percentage reported in 2007. The largest volume of testing reported across all laboratory sizes was for Newborn Screening and Childhood Diseases; this is unchanged from 2007.

SPHLs are complex scientific institutions and are not inexpensive to maintain; the expenses for personnel continue to be the highest expenditure for all laboratories. In 2010, the average personnel cost for the responding laboratories topped the second highest expense (for supplies) by more than 4 million dollars. Although 14 new laboratories were built in the past five years with an average cost of about 40 million dollars, most of these were built for medium-sized laboratories and most were built as central facilities.

Drinking water is the most common environmental test, with lead being the most common environmental contaminant for which testing is provided. The majority of the responding laboratories report they provide clinical testing for the most common causative organisms of foodborne illness outbreaks, but laboratories were less likely to perform testing on food and water.

More than 80% of responding laboratories of all sizes have developed or evaluated new technologies or methods in the advancement of public health laboratory practices, and most have documented and shared these developments or evaluations with the laboratory community. Eighty-four percent of laboratories who applied for grant funding received that funding; most of these were involved with applied-research work.

INTRODUCTION

Developing an Image of the State Public Health Laboratory

For more than a century, the Public Health Laboratory System has been at the epicenter of the public health system, offering services essential to protecting the health of the public while providing the scientific expertise vital to making wise judgments and decisions concerning public health. As part of its mission, APHL works to support and strengthen State Public Health Laboratories (SPHL) and the State Public Health Laboratory System in the United States. Within the 50 SPHLs and the District of Columbia, there exists a wide variety in funding, infrastructure, operations, services, research initiatives, etc. APHL provides data and other information that both present an accurate image of SPHLs as well as describe the current state of our nation's SPHLs.

In 2002, APHL developed the Core Survey to capture a snapshot of SPHLs' activities in seven categories that either describe or affect PHLs' abilities to operate. In 2007, the survey instrument changed, but some questions remained consistent to capture the core data. Furthermore, in 2011, APHL modified the survey and renamed it the Core Laboratory Profiles Survey to capture essential laboratory data for the calendar year 2010. A set of core questions remained consistent for 2002, 2007 and 2010 for data comparison purposes.

This report provides detailed responses from the 2010 Core Laboratory Profiles Survey, which are complemented by responses to several questions posed in the 2010 Comprehensive Laboratory Services Survey (CLSS), a longitudinal survey conducted every two years. This enabled APHL to utilize data already collected without duplicating efforts in the CLSS survey.

By using data from two surveys instead of one, APHL has developed a clearer, more panoramic picture of SPHLs as they appeared in 2010. This data will be made available online as a project called the APHL Member Laboratory Profiles. This will allow SPHLs to view and update the profile of their laboratory as they adapt and evolve to meet the challenges of the 21st century. The information in these profiles will have an important impact as APHL continues to provide support and advocate on behalf of public health laboratories across the country.

This data summary report offers detailed analysis of the data collected in 2010 and makes comparisons to the 2007 data where available.

METHODOLOGY

In 2011, both the APHL Core Laboratory Profiles Survey and the CLSS were distributed to SPHLs nationwide. The Core Laboratory Profiles Survey was distributed to 50 states and the District of Columbia to gather data for the 2010 calendar year. Thirty-seven of the 51 laboratories completed this survey, for a response rate of 72%. The CLSS was sent to 50 states and the District of Columbia, and 49 of the 51 state laboratories completed the survey, for a response rate of 96%.

In both surveys, laboratories were classified according to the number of full-time employees (FTEs). This report contains an analysis of data in five sections, using responses from both surveys. Unless otherwise noted, data is taken from the Core Laboratory Profiles survey.

The following chart shows the criteria for size designation and the distribution of laboratories participating in both the Core and CLSS surveys.

Table 1. Laboratory size by FTE

Laboratory Size	Number of Labs Responding (Core Survey)	Percent of total Responding (Core Survey)	Number of Labs Responding (CLSS)	Percent of total Responding (CLSS)
LARGE (More than140 FTEs)	11	29.73	14	28.57
MEDIUM (74-140 FTEs)	13	35.14	18	36.73
SMALL (Less than 74 FTEs)	13	35.14	17	34.69
TOTAL	37	100	49	100%

The responding laboratories were fairly evenly distributed in size across both surveys. To eliminate any confusion caused by the disparity in the number of SPHLs responding in the two surveys, data in this report are expressed primarily in percentages, with the exception of charts and graphs.

SECTION I: FUNDING

The State Public Health Laboratory of the new millennium must provide more complex, state-of-the-art testing, faster and more efficiently than ever before, while guaranteeing accuracy of results and safety for staff as well as the public. The ability to rapidly respond to chemical or biological events must be maintained, which means staff must be trained, and plans must be in place for any contingency.

So, how do SPHLs obtain funding to stay on the cutting edge? How much do they receive? And how do they spend it?

Budgets

State public health laboratories are funded through a variety of sources, including federal, state and local government allocations and grants, fees for testing services, and reimbursements from third-parties.

From 2002 to 2007, budgets increased for laboratories of all sizes, generally attributable, in part, to the after-effect of the attacks of September 11, 2001, and the subsequent events. This trend continued for large and small laboratories from 2007 to 2010, but the average total budgets for medium-size laboratories decreased slightly in 2010. This may have been the result of compensating for the relatively large increase (114%) in budgeting medium-size laboratories experienced between 2002 and 2007 (See Table 2).

Table 2: Average Budget

Average Budget				
Laboratory Size	**2002**	**2007**	**2010**	**% increase From 2007**
LARGE	$16,702,696	$19,920,220	$30,911,733.45	55%
MEDIUM	$7,535,484	$16,107,070	$14,641,382.00	-9%
SMALL	$3,407,535	$6,065,654	$7,133,691.62	18%

State and local funding was the primary funding source for both small and large laboratories in 2010. This reflects a change in funding for small laboratories, who reported federal funding (37%) as the largest single source in 2007. Medium-size laboratories, who received their largest source of revenue in 2007 from state funding, cite fee-for-service as their largest source of funding in 2010.

In 2010, federal funds accounted for twice as much of the annual budget in small laboratories (32%) as in large laboratories (16%) (See Table 3). This is comparable to the 2007 results, where federal funding accounted for 37% of the budget in small laboratories and 15% in large laboratories.

Table 3: Funding Sources by Lab Size

Laboratory Size	Average Federal Funding	Average State/Local Funding	Average Fee-for-Service Funding	Average Other Funding
LARGE	$4,864,781	$10,936,019	$8,098,472	$7,012,461
MEDIUM	$3,876,308	$3,523,616	$7,035,667	$205,791
SMALL	$2,316,696	$2,896,282	$1,233,934	$686,779

Both small and medium-size laboratories received more federal funding in 2010 than in 2007 (See Table 4).

Table 4: Average Federal Funding

Laboratory Size	2007	2010	% Change 2007-2010
LARGE	$2,899,561	$4,864,781	67.8%
MEDIUM	$2,719,980	$3,876,308	42.5%
SMALL	$2,060,860	$2,316,696	12.4%

While funding to large-size laboratories appears to have increased as well, this cannot be clearly determined since, in the 2007 Core Survey, four large-size laboratories did not report the funding they received from CDC.

CDC Total Funding

Overall, CDC accounted for 82% of all federal funding to the responding SPHLs in 2010 and provided 18% ($110,258,959.00) of the total funding to these laboratories.

Both large and medium-size laboratories saw an increase in total CDC funding from 2002 to 2007 and again in 2010. Small-size laboratories received a much larger increase (179%) than did medium or large laboratories between 2002 and 2007 but experienced a 9% decrease in total CDC funding in 2010. Table 5 shows the average total CDC funding for 2002, 2007 and 2010.

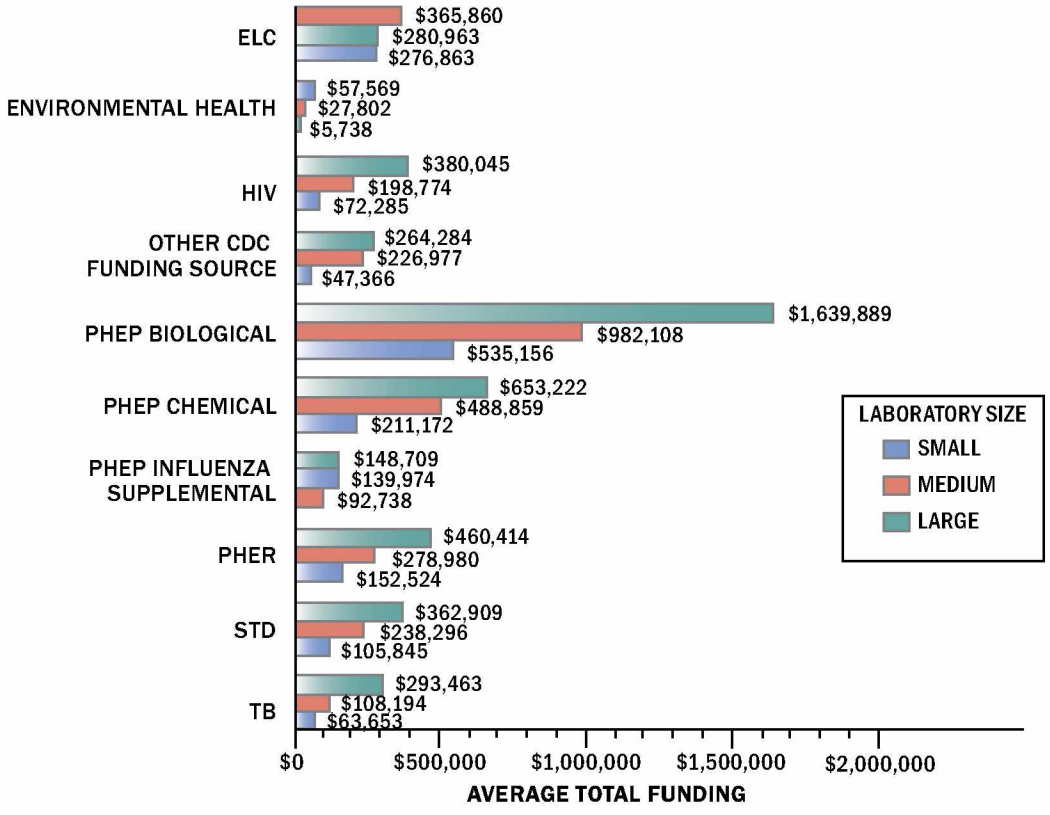
Table 5: Average CDC Funding

Average Total CDC Funding				
Laboratory Size	2002	2007	2010	% increase From 2007
LARGE	$1,365,363	$2,577,783	$4,489,637	74%
MEDIUM	$1,297,619	$2,727,063	$3,019,588	11%
SMALL	$653,824	$1,821,485	$1,662,947	-9%

CDC provides funding to SPHLs through a variety of programs. For the responding laboratories overall, the largest amount of CDC funding was provided to the Public Health Emergency Preparedness (PHEP) biological program ($37,763,211) and PHEP chemical program ($16,435,872). This is similar to the 2007 report, in which participating laboratories also received the most funding from the PHEP biological program. CDC's Epidemiology and Laboratory Capacity (ELC) program provided the third-highest amount of funding from that agency in 2010.

Unlike funding for the PHEP programs, in which large laboratories received the most funding, the ELC program distributed the most funding to medium-size laboratories. Of all CDC programs, the Environmental Health program received the least funding across all laboratory sizes.

Figure 1: Average CDC Funding by Program, FY 2011



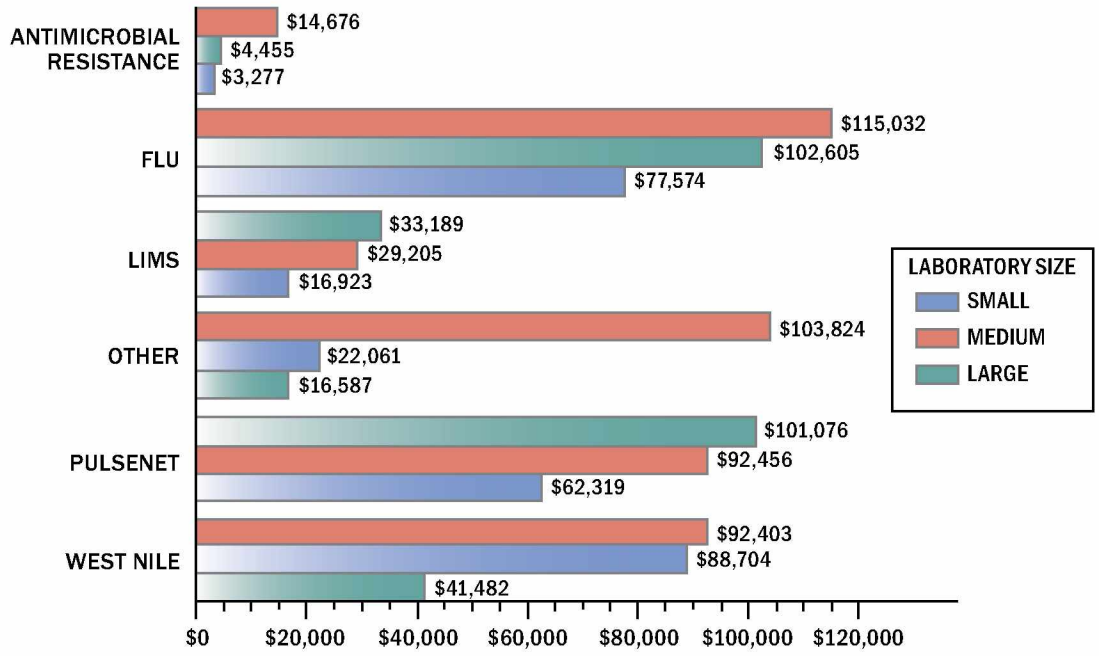
See Figure 1 (page 9) for the average total CDC funding by program and laboratory size for the responding laboratories in 2010. Other CDC funding sources included EIP, Ryan White, ASPR, Affordable Care Act, USDA Food Emergency Response Network, various immunization grants, maternal child health block grants, TB NAAT expansion grants and TB genotyping grants.

CDC ELC Funding by Program FY 2010

In FY 2010, the CDC's ELC program provided the most funding to influenza programs, with laboratories receiving an average of $98,177. This is a change from 2007, when influenza programs were the third-highest recipients of ELC funds. Funding for PulseNet was the second most-funded program in 2010, and West Nile Virus was third, as compared with its top position in the 2007 survey.

In general, medium-size laboratories received the most ELC monies from CDC in FY 2010 across all programs, with the exception of LIMS and PulseNet, where large laboratories received slightly more funding. Figure 2 summarizes the average ELC funding for specific programs, as reported by laboratories who reported receiving ELC funds in FY 2010.

Figure 2: Average ELC Funding by Program



Among the "other" ELC funded programs cited by responding laboratories were Lyme Disease, Tick-borne Diseases, Travel and Norovirus, PPACA enhanced capacity, General Lab Capacity, Pertussis, NARMS, Specimen transport and shipping, *Salmonella* serotyping and Shigatoxin positive *E.Coli* serotyping.

Services Billed

Laboratories also derive income by billing for various services they provide to other agencies or organizations. Fee-for-Service accounted for a total income of $196,588,001 for all responding laboratories in 2010 and showed an increase in both medium and large laboratories.

Table 6: Average Fee-For-Service Income

Laboratory Size	2007	2010
LARGE	$6,200,388	$8,098,472
MEDIUM	$2,689,064	$7,035,667
SMALL	$1,621,354	$1,233,934

In 2010, most responding laboratories billed for services to other state agencies. The percentage of responding laboratories billing for Medicaid has risen slightly since 2002. In 2010, laboratories of all sizes billed Medicaid at about the same average rate (62%). Small laboratories tend to bill other state agencies at a higher rate than do large laboratories or medium-size laboratories. In 2010, large-size laboratories billed Medicare (45%) at three times the rate of medium laboratories (15%) and twice that of small laboratories (23%). The percentage of laboratories that bill private insurance carriers has been rising since 2002, when 29% of responding laboratories reported doing so. Increases have since occurred, both in 2007 (31%) and 2010 (35%).
See Table 7 (page 12).

Table 7: Entities Billed by Responding Laboratories in 2010

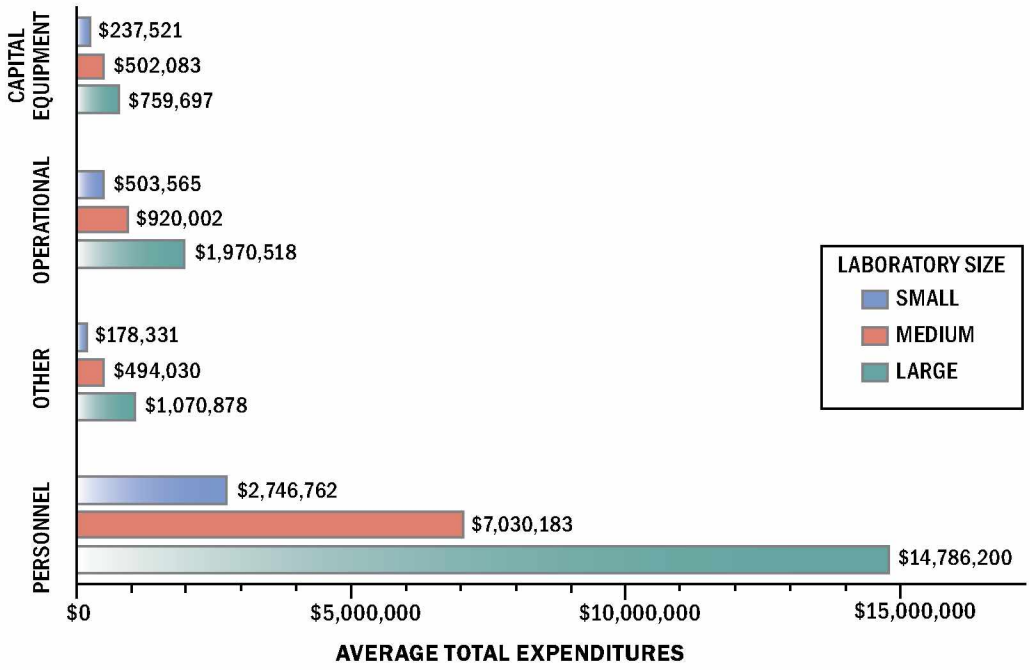
Fee For Service	
Billing Entity	**Percent of Labs Responding**
Other State Agencies	72.97%
Private Clients	64.86%
Medicaid Insurance Plans	62.16%
Private Insurance Plans	35.13%
Other	35.13%
Medicare	27.02%
Other States	10.81%

Expenditures

The SPHLs' expenditures for personnel reflect the importance of maintaining a well-trained workforce to provide high-quality results while assuring workforce safety. In 2010, the average spending for personnel, at $7,831,040, remained the single most costly expenditure for responding laboratories of all sizes and topped the second-highest average expenditure (supplies) by more than 4 million dollars. Although expenditures for personnel increased the most (33%) in large laboratories since 2007, these costs also rose in small (8.5%) and medium-size (9.0%) facilities. The average expenses for fees, leases and overhead were the third highest for laboratories, regardless of size, while the lowest average expenditure for all laboratories was education and training.

Figure 3 depicts FY 2010 expenditures by laboratory size after collapsing the education and training, travel, fees, leases and overhead, service agreements and supplies into Operational Expenses. "Other" expenses included dues, mail, freight, courier fees, consulting fees, information technology, accounts payable interest and fees, and laboratory maintenance fees.

Figure 3: Expenditures by Lab Size



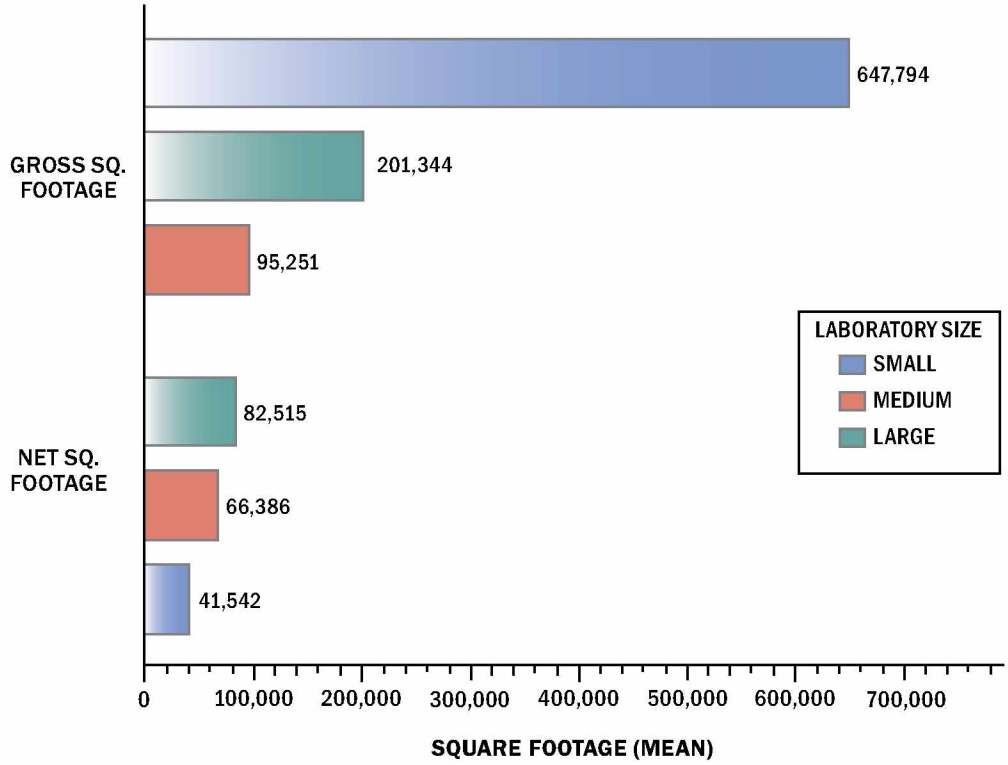
Laboratories also pay for various services provided by departments or organizations outside the laboratory. Of the 37 responding laboratories, 81% cited Information Technology support as an external expense, and 75% incurred expenses for Human Resources services provided by an outside source.

SECTION II: INFRASTRUCTURE

Size of facility

The average net square footage for large laboratories (82,515) was approximately twice that of small laboratories (41,542). Medium-size laboratories fell in the middle with an average net square footage of 66,386 (See Figure 4). Additionally, small laboratories reported the largest gross square footage, yet have the smallest net square footage.

Figure 4: Gross and Net Square Footage of Laboratories



Co-locating with Other Agencies

Sixty-five percent of responding laboratories reported co-locating with other agencies or departments in their building. This does not appear to be related to laboratory size since laboratories of all sizes tend to co-locate in equal percentages.

Half of the laboratories that co-locate with other agencies indicated they co-locate with Environmental, Epidemiology, or some other health-related department or agency. To a lesser degree, SPHLs co-locate with Agriculture, Forensics or Toxicology agencies.

New Facility

In the past 5 years, 38% of laboratories reported building a new facility. Of those, 57% built medium-size facilities. Small laboratories built the fewest new laboratories in the past five years. Most (71%) of the new facilities were central laboratories. The cost of building a new facility remained fairly constant regardless of laboratory size (See Table 8).

Table 8: Average Cost of Building

Laboratory Size	Total	Min	Max	Mean	Median
LARGE	$113,000,000	$13,000,000	$85,000,000	$37,666,667	$15,000,000
MEDIUM	$335,250,000	$25,000,000	$78,600,000	$41,906,250	$35,850,000
SMALL	$74,200,000	$24,200,000	$50,000,000	$37,100,000	$37,100,000
Total	$522,450,000	$13,000,000	$85,000,000	$40,188,462	$35,700,000

Some laboratories are moving towards being environmentally friendly. Of those who built a new facility, 29% achieved Silver status in Leadership in Energy and Environment Design (LEED) ratings. When asked about plans to build a new facility, 30% plan to build a new facility in the next five years.

Laboratory Information Management System (LIMS)

Of the laboratories responding to the CLSS Survey, 73% reported having multiple LIMS in place to cover all functional areas of the laboratory, while just 22% have a single, enterprise-wide LIMS. Of those reporting a single, enterprise-wide LIMS, 41% are small laboratories, a much higher rate than either medium-size or large laboratories. This may reflect the fewer number of testing areas that must be integrated into the system in small laboratories.

SECTION III: OPERATIONS

Laboratory Advisory Committee

Laboratory Advisory Committees (LAC) may also be known as Laboratory Advisory Councils or Clinical Technical Advisory Groups. A LAC is a statewide, voluntary, multidisciplinary network established by the state public health laboratory to facilitate inter-laboratory communication, collaboration and cooperation. Thirty five percent of responding laboratories reported having an active LAC. This number is similar to the 38% who reported having an active LAC in 2007.

More than half of the laboratories that have a LAC discuss the following topics: Policy Recommendations; All Hazards Preparedness (Including bioterrorism/chemical terrorism); Newborn Screening; Laboratory Administration, and Influenza and Emerging Infections. Only 38% of these LACs cover Technical Management.

Mission statements and strategic plans serve to define the purpose of the organization and list the activities it will fulfill for a given time period. In 2010, 84% of responding laboratories reported having a mission statement in place. This is a slightly lower percentage than the 88% reported in both 2007 and 2002, which is attributed to different laboratories responding to the survey. In terms of the strategic plan, 70% of responding laboratories have a strategic plan in place. This is an increase from previous years: in 2002, this figure was 62%; and in 2007, it was 42%. Of the laboratories indicating they have a strategic plan in place, 88% updated their plan within the past two years or were updating it.

In terms of annual reporting, 41% of the responding laboratories publish an annual report. This is an increase from both 2002 (26%) and 2007 (31%). This gradual rise suggests that each year, more SPHLs are publishing an annual report.

Accreditation

Accreditation is another important aspect. When asked to cite certifications or accreditations held by their laboratories, 94% of those responding in the CLSS cited Clinical Laboratory Improvements Amendment (CLIA), 78% cited the Environmental Protection Agency (EPA), and 55% cited the Food and Drug Administration (FDA). Of those who answered under the category of "Other" (32.65%), the majority cited the CDC Select Agent Program. Table 9 provides all certifications and accreditations cited by the 49 responding laboratories. When asked about ISO certifications, only 10% of laboratories reported to be ISO 17125 certified.

Table 9: Certifications and Accreditations

Type of Certification or Accreditation	Percent of Reporting Labs
Clinical Laboratory Improvement Amendments (CLIA)	93.87 %
Environmental Protection Agency (EPA)	77.55 %
Food & Drug Administration (FDA)	55.10 %
Other	32.65 %
American Industrial Hygiene Association (AIHA)	24.48 %
College of American Pathologists (CAP)	24.48 %
National Environmental Laboratory Accreditation Conference (NELAC)	22.44 %
United States Department of Agriculture (USDA)	20.40 %
American Association for Laboratory Accreditation (A2LA)	6.12 %
American Society of Crime Laboratory Directors (ASCLD)	2.04 %
Society of Forensic Toxicologists (SOFT)	2.04 %
The Joint Commission (TJC)	2.04 %

SECTION IV: SERVICES

Testing Menu/Services Guide

SPHLs provide a wide variety of services to the public. Nearly all (95%) of responding laboratories publish a laboratory services guide; this is a 7% increase from 2007, when only 88% did so. Of the laboratories who published a services guide in 2010, 94% make it available via the Internet, an 8% increase over the 86% seen in 2007.

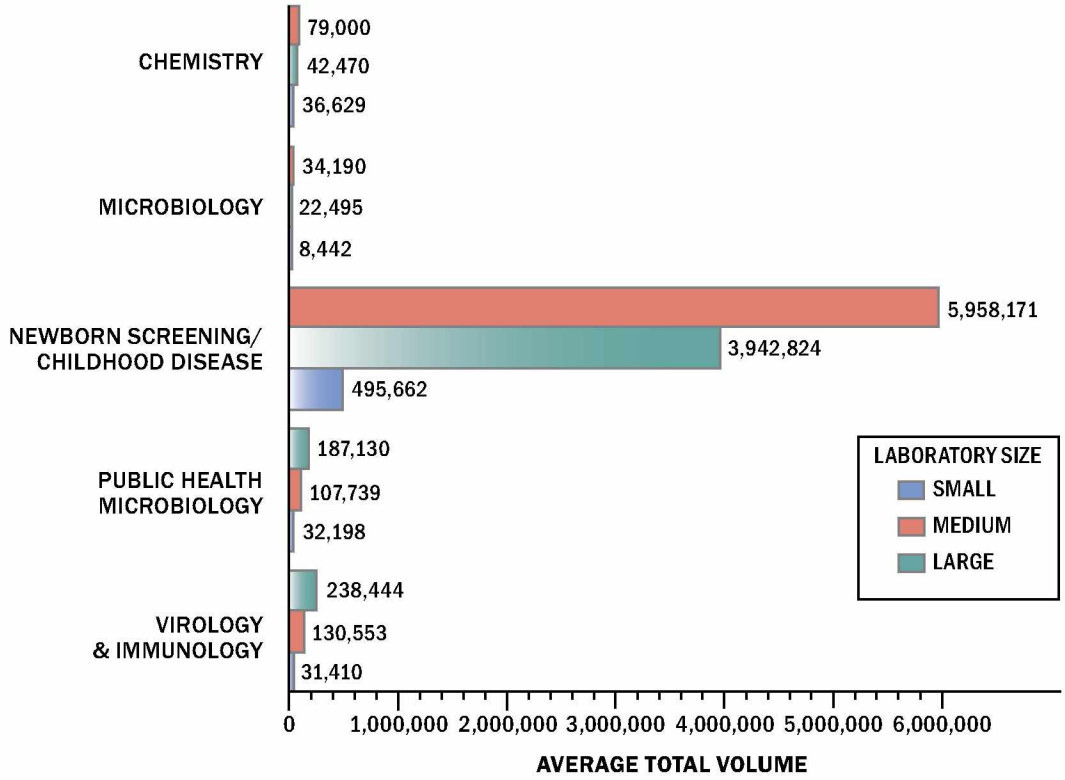
In 2010, 68% of responding laboratories published a fee schedule. This is slightly more than the 62% reported in the 2007 Core Survey.

Testing Volume

The largest volume of testing reported across all laboratory sizes was for Newborn Screening and Childhood Diseases, with a total volume of 127,270,889 tests for the 37 laboratories surveyed. This is similar to the 2007 results in which Newborn Screening accounted for the largest single portion (35%) of the testing menu for participating laboratories. In 2010, medium-size laboratories performed more tests in this category than either large or small-size facilities.

As seen in Figure 5, the majority of Public Health Microbiology and Virology & Immunology testing are performed by large-size laboratories.

Figure 5: Average Testing Volume, FY 2010



Infectious Disease

Infectious Disease is another important test service provided by SPHLs. The survey listed 19 testing services for infectious disease and asked the responding laboratories to indicate which of these they offer. All 37 laboratories reported they perform testing for HIV 1, influenza and tuberculosis. Nearly all laboratories perform West Nile virus testing (97%) and Western blot testing (94.5%). Less than half of the laboratories surveyed provide testing for hantavirus and rotavirus. The least-common testing was for Lyme disease, with only a fourth of the responding laboratories offering this analysis. See Table 10.

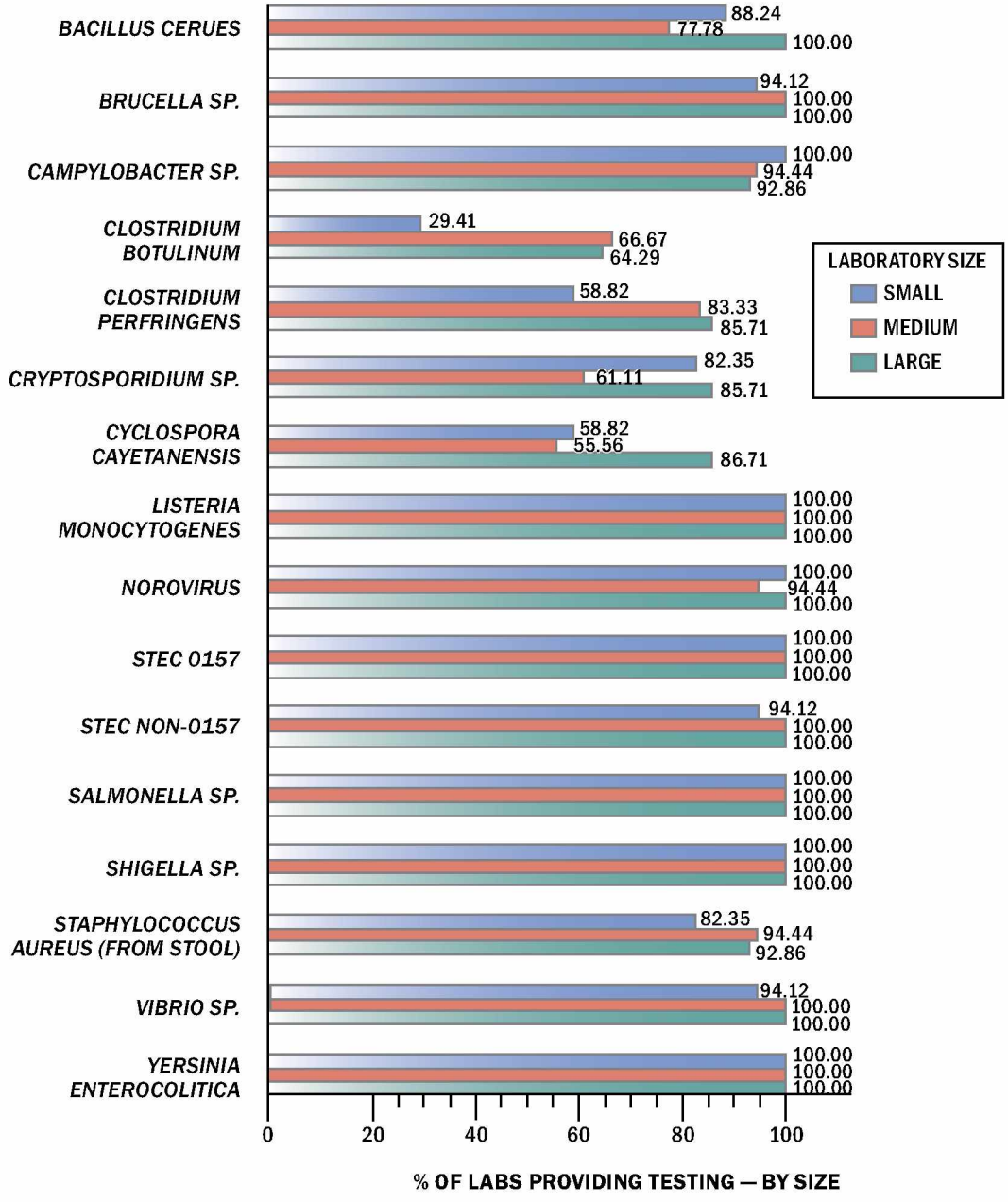
Table 10: Infectious Disease Testing 2010

Laboratory Tests	Percent of Reporting Labs
HIV 1	100.00 %
Influenza	100.00 %
TB	100.00 %
West Nile Virus	97.29 %
Western Blot	94.59 %
Varicella	91.89 %
HIV 2	89.18 %
Rabies	86.48 %
Rubella	86.48 %
Mumps	83.78 %
Hepatitis B	83.78 %
Diphtheria	81.08 %
Measles	81.08 %
Legionella	78.37 %
Malaria	75.67 %
Fungal Mycology	54.05 %
Hantavirus	37.83 %
Rotavirus	35.13 %
Lyme disease	24.32 %

Foodborne Illness

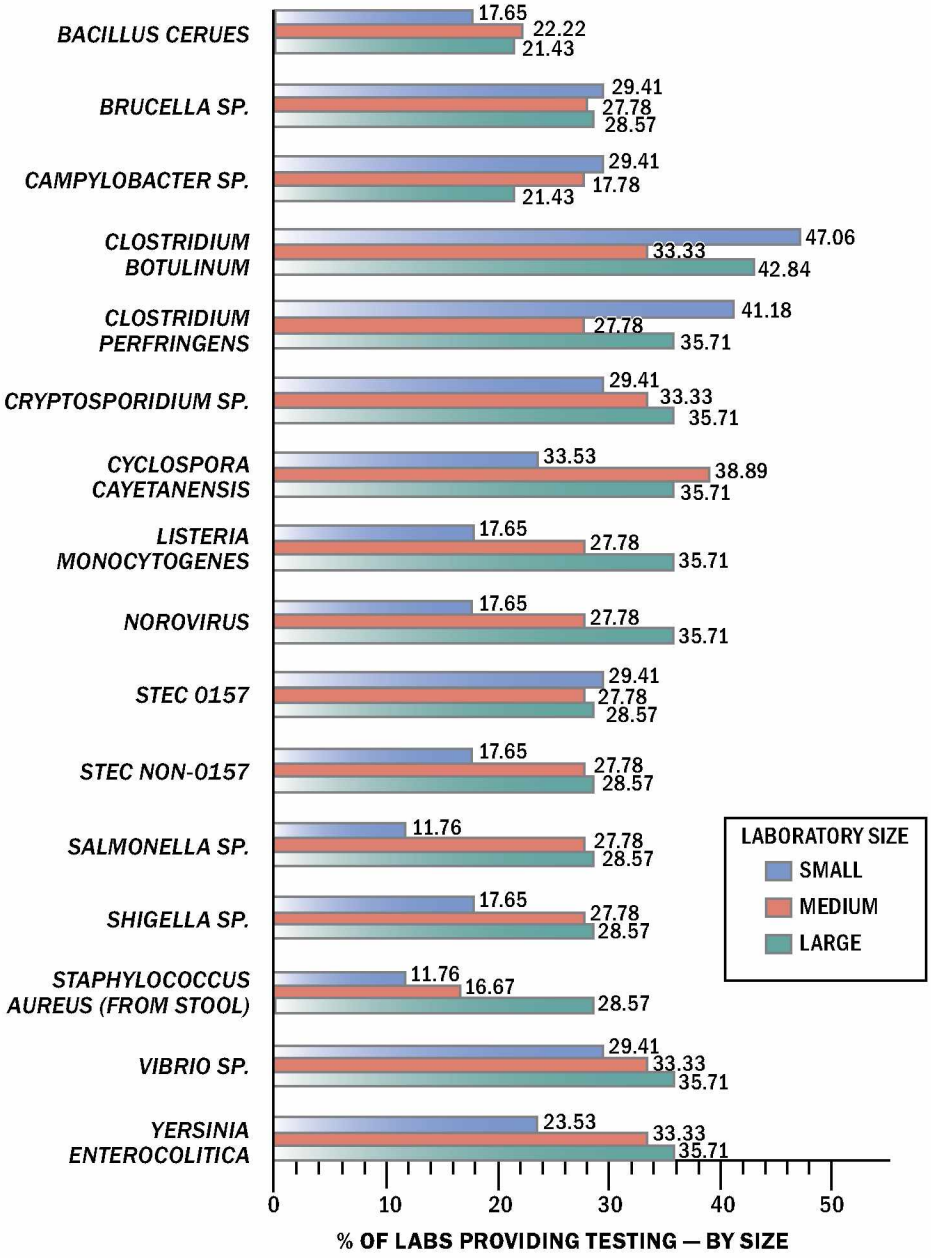
During foodborne outbreaks, SPHLs provide testing of clinical samples to isolate and identify the causative organism(s). Most of the laboratories responding to the CLSS, regardless of size, provide clinical testing for common organisms encountered in foodborne-related outbreaks, such as *Brucella* sp., *Campylobacter* sp., *Listeria*, norovirus, STEC 0157, STEC non-0157, *Salmonella*, *Shigella*, *Staphlococcus aureus* (from stool specimens), and *Yersinia enterocolitica*. The organisms for which the fewest number of laboratories of all sizes provide testing are *Clostridium botulinum* and *Cyclospora cayetanensis*. Figure 6 depicts Clinical Testing that was provided by SPHLs for Foodborne Illness in FY 2010.

Figure 6: Clinical Testing for Foodborne Illness in FY2010



Once an organism is isolated and identified in a clinical (patient) specimen and determined to be part of an outbreak, the same organism must be extracted, isolated and identified in a food or water source so the contaminated product can be identified and subsequently recalled. On the whole, the responding laboratories were much less likely to perform testing on food and water than on clinical specimens. Just 41% of responding laboratories provide testing of food or water for *Clostridium botulinum*, which was the organism for which the laboratories most commonly provided testing. Forty-seven percent of small laboratories provide this testing, compared to 43% of large and 33% of medium-size laboratories who do so. The percentage of small-size laboratories that test for Brucella sp., *Campylobacter sp., Clostridium perfringens* and STEC non-0157 also exceeds the percentage of medium and large-size laboratories that provide this same testing. See Figure 7.

Figure 7: Food and Water Testing for Foodborne Illness



Newborn Screening

Newborn Screening (NBS) provides early identification of medical conditions which, left undiagnosed and untreated, can have a catastrophic effect on a child's life. State public health laboratories conduct newborn screening tests for greater than 95% of the more than 4 million babies born in the United States each year. As noted earlier, newborn screening and testing for childhood genetic and inherited disorders was the largest volume of testing reported across laboratories of all sizes for CLSS survey respondents in 2007 and 2010.

Although it varies by condition, approximately 60% of state public health laboratories responding to the CLSS survey reported that they provided newborn screening testing for the majority (28 out of 30) of the core panel conditions; approximately 10% reported that they assured newborn screening testing for the majority of the core panel conditions; and 30% responded that they neither provided nor assured testing for the majority of the core panel conditions. The core newborn screening panel includes organic acid conditions, fatty acid disorders, amino acid disorders, hemoglobinopathies and other disorders such as Cystic Fibrosis. Additionally, Severe Combined Immunodeficiency (SCID) was newly recommended to the panel; thus, screening for this condition was performed only in a very small number of states. According to the CLSS survey data, four of the state public health laboratories (all large in size) reported that they conduct newborn screening for SCID.

As would be expected, large laboratories tend to have greater rates of testing for all core panels than do medium-size and small laboratories. Of the SPHLs responding in the CLSS, 65% provide testing for the three hemoglobinopathies, HB S/A Beta-thalassemia, HB S/C Sickle-C disease and HB S/S Sickle cell disease, while 59% provide testing for Phenylketonuria/hyperphenylalaninemia (PKU).

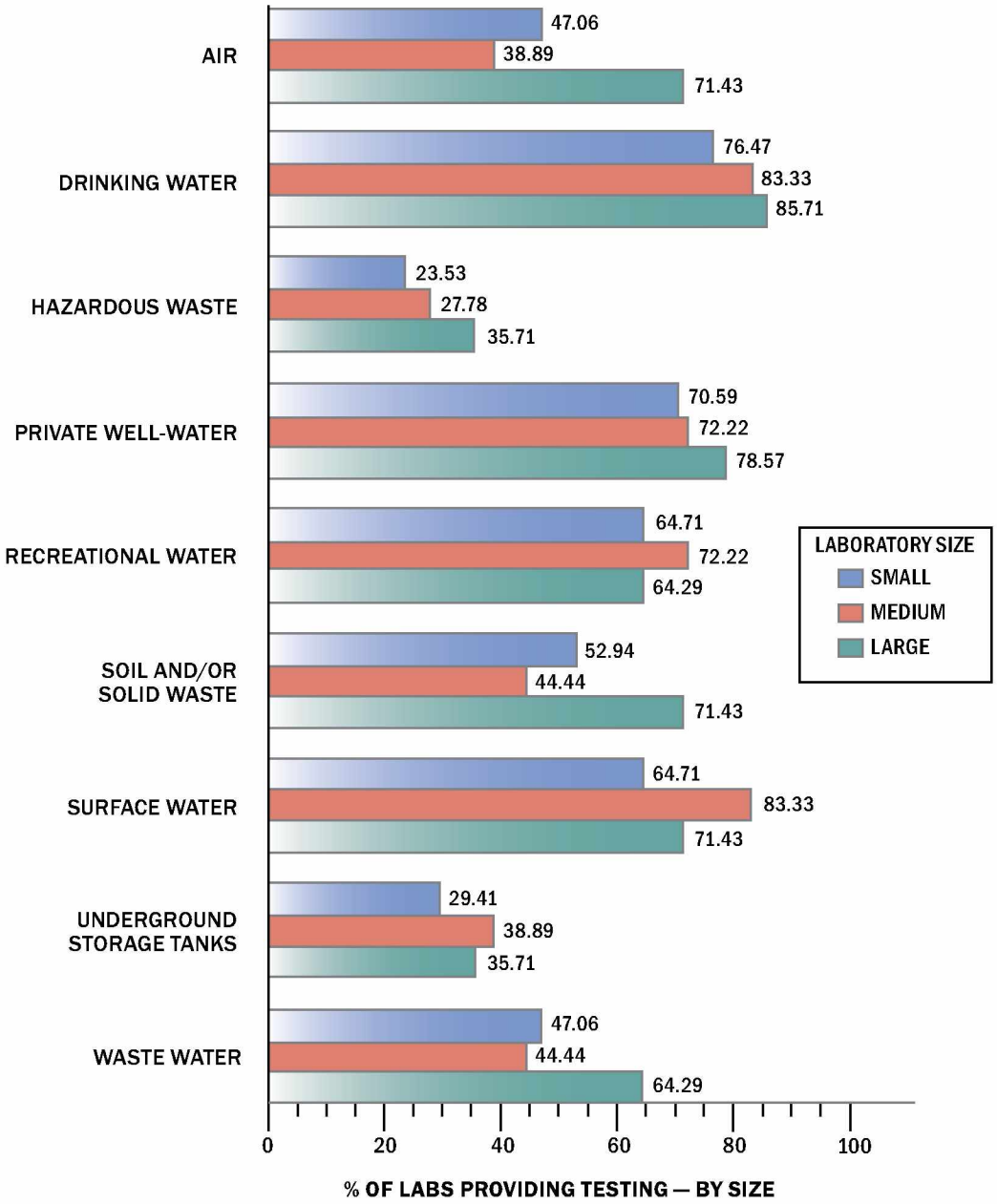
The CLSS data was compared with data collected from the National Newborn Screening and Genetics Resource Center, which is a national repository of data entered by states and updated on a regular basis. The two datasets had several inconsistencies, which may be partially due to a lack of understanding by respondents of the CLSS survey definitions of "assure" and "provide." The high frequency of state laboratories in the CLSS survey reporting that they neither provided nor assured newborn screening testing indicates that there may have been reporting inaccuracies. According to the National Newborn Screening Genetics Resource Center, 15 states outsource their newborn screening services to other states or private entities. Additional states outsource some of their newborn screening testing and perform some of it in-house. Thus, every state in the United States should either be providing or assuring newborn screening testing. This is not reflected in the CLSS survey.

Environmental Health

In the 2010 CLSS, the most common environmental matrix for which the responding SPHLs provide testing is drinking water. An average of 82% of the respondents reported providing this test (i.e., 86% of large laboratories, 83% of medium-size laboratories, and 76% of small laboratories provide this testing). The second most common environmental test is private well water and surface water, reported 73% of respondents. Water, from various sources, was the most common type of sample tested, which compares to 2007, when water samples accounted for 62% of environmental samples. Testing of hazardous waste was reported by the least number of laboratories in 2010 (29%).

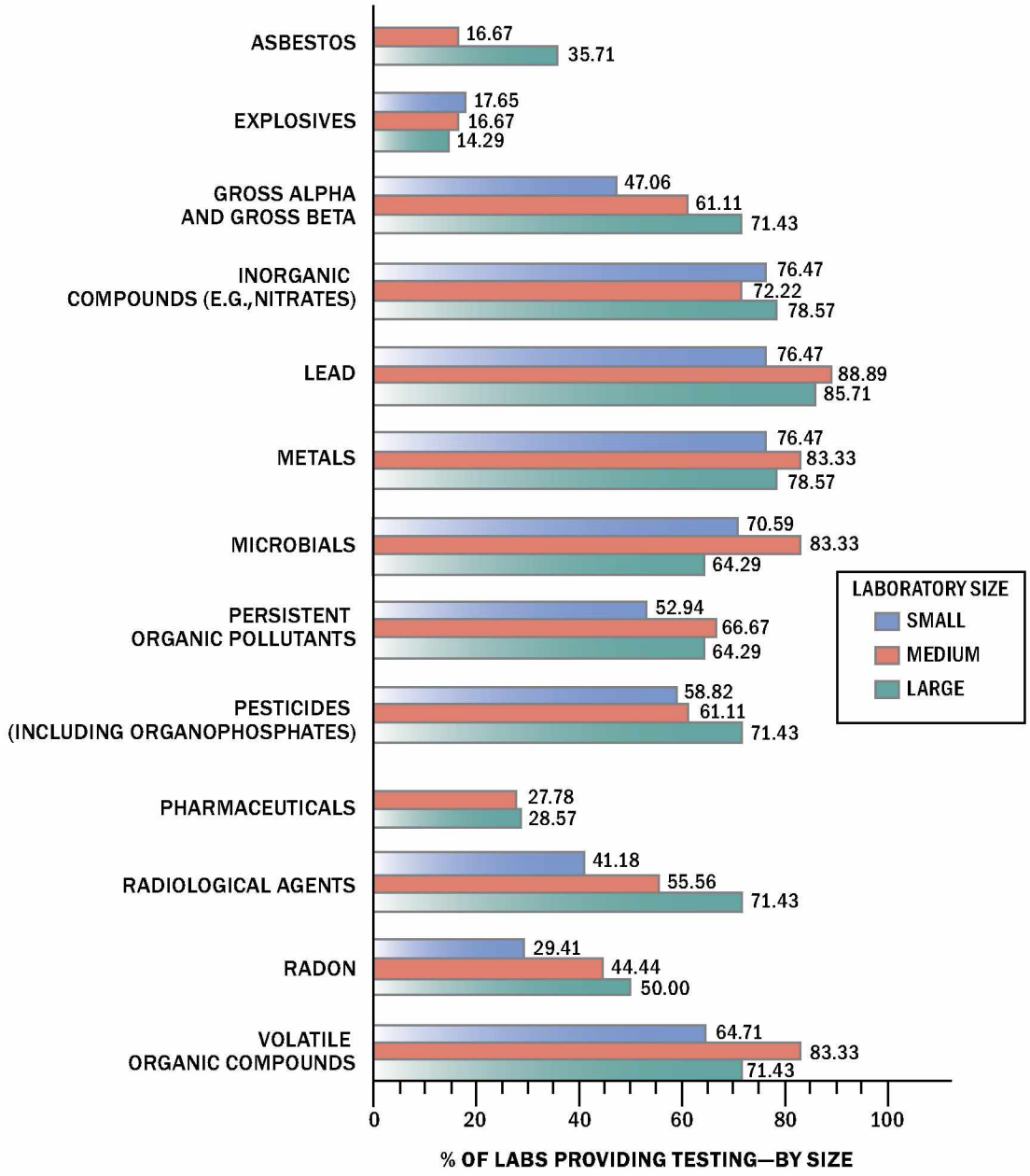
Large laboratories frequently provide testing for all environmental matrices. Large laboratories provide testing more often than medium-size and small laboratories for all matrices, with the exception of recreational water, surface water, and underground storage tanks. In these cases, a greater percentage of medium-sze or small laboratories provide testing. See Figure 8.

Figure 8: Percentage of SPHLs Providing Testing for Matrices



Lead is the most common environmental contaminant for which SPHLs responding in the CLSS provide testing (84%), with a slightly higher percentage of medium-size laboratories providing this testing than large and small laboratories. Across all laboratory sizes, metals (80%) and inorganic compounds (76%) are the next most common contaminants for which SPHLs provide testing. The least common contaminants for which testing is provided are asbestos (16%), explosives (16%) and pharmaceuticals (18%). See Figure 9.

Figure 9: Testing for Contaminants



Training

Many states and/or SPHLs provide training and or training support for State Public Health Laboratory staff. Training might consist of in-house learning sessions and workshops or classes provided for staff, or support in the form of travel and registration costs for meetings, seminars and workshops outside of the workplace. Offering leave-time for staff to attend such sessions is another form of training support.

All responding laboratories in the 2010 CLSS provide in-house training and/or workshops for SPHL staff. Eighty-six percent of laboratories offer leave-time and travel costs for off-site meetings, seminars and workshops, while 80% offer leadership training for supervisors and managers.

State Training Coordinators were on staff at 94% of the laboratories surveyed. All small laboratories had a Training Coordinator. Two medium-size and one large-size laboratory did not have a Training Coordinator. Of the training coordinators, 43% of them spend zero to 25% of their time performing training activities. In large laboratories, 38% of Training Coordinators spend 76% to 100% of their time performing training activities as compared with those in small laboratories (29%) and medium-size laboratories (25%) who do so.

In the last year, 94% of the responding laboratories sponsored or co-sponsored training activities. Forty-three percent reported that no state law, regulation or laboratory policy mandated that professional laboratory staff must take part in continuing education (CE) programs. While just 24% indicated state law or regulation required continuing education, 35% of respondents indicated their laboratory has a continuing education policy. Other CE requirements cited by respondents include CAP or other certifying agencies.

SECTION V: APPLIED RESEARCH

As conducting applied research becomes more prevalent in SPHLs, 82% of all laboratories of all sizes represented in the CLSS indicated their laboratory has developed or evaluated new technologies or methods in the advancement of public health laboratory practices. Of those, 83% reported documenting and sharing their developments or evaluations with the laboratory community. Small laboratories were less likely to document and share their findings.

A large percent (69%) of laboratories have partnered with other public health disciplines or agencies in conducting applied or practice-based research. Additionally, medium-size laboratories were most likely to partner with other disciplines. Epidemiology and Environmental Health were the disciplines with which SPHLs partnered most frequently. See Table 11.

Table 11: Research Partners

Partner with other disciplines	Percent of responding labs
Epidemiology	61.22 %
Environmental Health	57.14 %
Newborn Screening Program	36.73 %
Maternal and Child Health	24.48 %
Public Health Statistics	16.32 %
Radiological Health	16.32 %
Other	12.24 %
Occupational Health	10.20 %

Just over a third (37%) of all responding laboratories reported having a formal, research-supporting relationship with a university engaged in research. Only 31% of the 49 responding laboratories have had a formal research-supporting relationship with an academic center in their state or region. Sixty-three percent of laboratories have applied for grant funding to support some type of research. Of these, 42% were medium laboratories, 39% were large, and only 19% were small laboratories. Of those who applied for grant funding, 84% received that funding. Most of those receiving funding were involved with applied-research work, followed by clinical research projects.

Almost all (96%) of the responding laboratories in the CLSS reported publishing research in peer-reviewed journals, submitting abstracts or posters to scientific meetings or making presentations at professional meetings.

SUMMARY

The average total budgets for medium-size SPHLs decreased slightly in FY 2010, while fee-for-service emerged this year as the largest funding source for these mid-size facilities. Fee-for-service income also increased in large-size laboratories in FY 2010. It will be interesting to see if fee-for-service continues to be the largest funding source for medium-size SPHLs in the future, and if so, will a trend be identified in laboratories across all sizes?

In 2010, personnel costs continued to be the highest expenditure across all laboratories. As budgets tighten across the country and laboratory activities expand to support new technologies and emerging public health needs, it will be imperative for SPHLs to attract and maintain the most talented staff available. In order to do more with less, staff must be skilled and able to work at peak performance with maximum ability.

Sharing space is common. In 2010, 65% of SPHLs surveyed co-locate with other agencies or departments in their building. Thirty-eight percent of responding laboratories have built a new facility in the past five years, at an average cost of 40 million dollars. Of those who did not build during that time period, 30% plan to do so in the next five years.

The number of active Laboratory Advisory Committees does not appear to be increasing. In 2010, 35% of the responding laboratories had an active Laboratory Advisory Committee, similar to the 38% reported in 2007.

One area that invites change is the lack of a single, integrated LIMS in most laboratories, especially in medium and large-size laboratories. Nearly three-fourths of all laboratories responding to the survey have not yet integrated their various information management systems into one, lab-wide system that covers all functional areas of the laboratory.

Most of the laboratories surveyed, regardless of size, provide clinical testing for common organisms encountered in foodborne-related outbreaks. Overall, SPHLs were less likely to perform testing on food and water than on clinical specimens.

State Training Coordinators were on staff at 94% of the laboratories surveyed, but nearly half of these coordinators spend less than one-fourth of their time performing training activities.

In 2010, as in 2007, testing for Newborn Screening and childhood genetic and inherited disorders accounted for the largest volume of testing reported across all sizes of laboratories. Over half of the laboratories surveyed in 2010 provide testing for the Core Panels for Organic Acid Disorders (OA), Fatty Acid Disorders (FAD) and Amino Acid Disorders (AA). Sixty-five percent provide testing for the three hemoglobinopathies, HB S/A Beta-thalassemia, and HB S/C Sickle-C disease and HB S/S Sickle cell disease.

There was a slight increase in the percentage of laboratories that have partnered with other public health disciplines in conducting applied or practice-based research. While not a traditional SPHL initiative, research is becoming more common as a means to validating innovative technology or perhaps as a way to generate funding. If this trend continues, future years may also see increases in formal research-supporting relationships between SPHLs and universities engaged in research.

APHL ASSOCIATION OF PUBLIC HEALTH LABORATORIES

8515 Georgia Avenue, Suite 700
Silver Spring, MD 20910
Phone: 240.485.2745
Fax: 240.485.2700
Web: www.aphl.org